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ABSTRACT

The purpose of this study was to determine if a change from a half day, everyday (HDED) kindergarten program to a full day, everyday (FDED) kindergarten program would result in significant differences in children's achievement. Data on children involved in the first 2 years of the FDED program in the Community Schools District, Grant Wood Area, Iowa, were compared to similar data on children involved in the last 2 years of the preceding HDED program. Data were collected upon entry into kindergarten, at the end of kindergarten, in the spring of the first grade, and in the fall of the second grade. Measures included a Waupun assessment of motor and verbal development and audio and visual perception, Metropolitan Readiness Tests, Gates-MacGinitie Reading Tests, Iowa Tests of Basic Skills, and demographic and school data. An analysis of covariance was used to adjust the outcome measures for initial differences that existed at the start of the study. Results indicated that although the FDED program provided more learning opportunities, these were not reflected in significant differences between the two programs at the end of the kindergarten year. Subsequent findings concerning first and second grade students indicated that their scores became more different from each other both between the years within a program and between the two programs even after initial differences were taken into account. (A bibliography and 11 tables are included.) (Author/RH)

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COMMUNITY SCHOOLS KINDERGARTEN SCHEDULING STUDY

MARCH 1987

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COMMUNITY SCHOOLS KINDERGARTEN SCHEDULING STUDY

Abstract

The purpose of this study was to see if the change from a half day, everyday (HDED) kindergarten program to a full day, everyday (FDED) kindergarten program would result in significant differences in achievement. Data on students involved in the first two years of the FDED program were compared to similar data on students involved in the last two years of the HDED program.

Measures were collected upon entry into kindergarten, at the end of kindergarten, in the spring of the first grade, and in the fall of the second grade. An analysis of covariance was used to adjust the outcome measures for initial differences that existed at the start of the study.

Results of the study indicate that although the FDED program provided more learning opportunities, these were not reflected in significant differences between the two programs at the end of the kindergarten year. Subsequent measures in the first and second grades indicate that the students' scores became more different from each other both within and between the programs.

COMMUNITY SCHOOLS KINDERGARTEN SCHEDULING STUDY

Introduction

Beginning in the fall of 1982 kindergarten students in the Community Schools District attended classes for a full day, everyday (FDED). Prior to that time kindergarten students attended classes for a half day, everyday (HDED). The purpose of this study was to see if the change from a HDED program to a FDED program resulted in significant differences in achievement. Data on students involved in the first two years of the FDED program were compared to similar data on students involved in the last two years of the HDED program.

A number of measures were collected on the students upon entry into the kindergarten year, at the end of the kindergarten year, during the spring of the first grade, and during the fall of the second grade.

Upon entering kindergarten, data were collected on the following: the occupation of the student's father; the highest number of years of education of the father and the mother (with 13 indicating completion of high school); the total number of hours in pre-school (not including day care); and Waupun screening data from the first quarter of the kindergarten year.

At the end of the kindergarten year, the following data were collected: Metropolitan Readiness Test scores; the Waupun level; the number of days the student was absent; and the percent of the class that was retained to repeat kindergarten or enter the transitional first grade.

In the spring of the first grade the Gates - Macginitie Reading Tests were administered. In the fall of the second grade the Iowa Tests of Basic Skills were given.

Measures

Strategies in Early Childhood Education - Waupun

The Strategies in Early Childhood Education were developed at the Cooperative Educational Service Agency 13 in Waupun, Wisconsin. Students entering kindergarten are screened by the Waupun assessment in the areas of motor and verbal development, and audio and visual perception. From the screening a profile is designed to help teachers plan for individual needs of each student to meet developmental and sequential objectives.

Metropolitan Readiness Tests

The Metropolitan Readiness Tests (MRT) are designed to assess the readiness of the subject to begin formal school

learning. Level II of the 1976 edition of the MRT is to be used at the end of the kindergarten year or at the beginning of the first grade. The Level II tests contain measures of auditory, visual, language, and quantitative abilities--the skills necessary in beginning reading and mathematics.

The maximum possible raw scores for the skill areas are: 29 for auditory; 26 for visual; 18 for language; and 24 for quantitative. A pre-reading skills composite includes the auditory, visual, and language subtests.

The five raw scores for each student (four skill areas plus pre-reading skills composite) are converted to stanine scores. Stanines are single-digit standard scores with a range of 1(low) to 9(high). A stanine of 5 represents the typical performance for a given group of pupils. Stanines avoid overemphasizing small differences in raw scores.

The pre-reading skills composite raw score is also converted to a percentile rank. A percentile rank indicates the percent of subjects obtaining raw scores equal to or lower than the specified score. For example, a subject with a composite raw score of 62 has a percentile rank of 77. This means that 77 percent of the subjects in the national norm group have raw scores equal to or less than 62, while 23 percent have raw scores above 62.

Gates - MacGinitie Reading Tests

The Gates - MacGinitie Reading Tests (G-M) have been designed to assess the subject's progress in reading. Level A is made up of a vocabulary subtest (which is primarily a test of decoding skills), and a comprehension subtest (which involves the total reading task).

The maximum possible raw score for the vocabulary subtest is 45 and 40 for the comprehension subtest. The total raw score is the sum of the subtest raw scores.

The three raw scores are converted to grade equivalents (G.E.). Grade equivalents identify the grade group whose median raw score is the same as the subject's raw score. For example, if a subject received a vocabulary subtest raw score of 32, his/her grade equivalent would be 1.4. The subject has done about as well on the subtest as would be expected of an average student on the same subtest after being in the first grade for four months.

Iowa Tests of Basic Skills

The Iowa Tests of Basic Skills are designed to provide information about skills performance. The Primary Battery is intended for ages 7 and 8 (Level 7 for grades 1.7-2.6 and Level 8 for grades 2.7-3.5). The Battery consists of 13 individual subtests: Listening, Word Analysis, Vocabulary, Reading Comprehension, Spelling, Capitalization, Punctuation, Usage, Visual Materials, References, Mathematics Concepts, Mathematics Problems, and Mathematics Computation. In addition four

composites are calculated--Language Skills (Spelling, Capitalization, Punctuation, and Usage), Work Study Skills (Visual Materials, and References), Mathematics Skills (Mathematics Concepts, Mathematics Problems, and Mathematics Computation), and a Total Test Composite.

The maximum possible raw scores for the subtests are: 32 for Listening; 49 for Word Analysis; 30 for Vocabulary; 66 for Capitalization; 50 for Punctuation; 24 for Usage; 29 for Visual Materials; 33 for References Materials; 33 for Mathematics Concepts; 22 for Mathematics Problems; and 26 for Mathematics Computation.

The performance of the subjects may be compared to local, state, or national reference groups.

The thirteen subtest raw scores for each student are converted to grade equivalents. Grade equivalents indicate the grade level at which the typical pupil makes a particular raw score. For example, if a pupil has a grade equivalent of 2.0, this means that the test performance equals that of a typical pupil just beginning the second grade. Grade equivalents are then averaged to arrive at the composite grade equivalents.

Review of the Literature

Half day, every day / Full day, alternate days programs

A review of the literature results in conflicting conclusions when comparing kindergarten programs that meet for a half day, every day (HDED) to those that meet for a full day on alternate days (FDAD). Gornowich, Volker, and Landry (1974) compared 787 Minnesota kindergarteners over a four year period. Pupils in FDAD kindergarten programs were significantly superior on five of the six subtests and the total test score of the Metropolitan Readiness Test (MRT) when contrasted to pupils in HDED kindergarten programs. Cleminshaw and Guidubaldi (1979) also found that FDAD kindergarten pupils were significantly superior to HDED kindergarten pupils on five of the six subtests and to the total test score on the MRT. They studied 96 pupils in four kindergarten classes in northern Ohio. Smith (1980) found that FDAD kindergarten pupils scored significantly higher on three of five subtests of the MRT when compared to HDED children. At the fourth grade level, however, there were no significant differences between those who had attended kindergarten on a FDAD schedule and those who had attended on a HDED schedule. Ulrey, Alexander, Bender, and Gillis (1982) and Stinard (1982) report that the FDAD kindergarten schedule, when compared to the HDED schedule, does not result in reduced academic performance. Gullo and Clements (1984) studied 99 pupils attending kindergarten on a HDED schedule and 98 pupils on a FDAD schedule. They report no significant differences between the two schedules when pupils were measured on the MRT. Similarly, Chippewa Falls Public Schools (1963) and Hatcher, Schmidt, and Cook (1979) found no significant differences between

FDAD pupils and HDED pupils when measured on the MRT.

No significant differences between FDAD pupils and HDED pupils were reported on the Cognitive Abilities Test in a study done by Mouw (1976). Biemiller (1983) studied 60 children who attended kindergarten on a HDED schedule, 82 who attended kindergarten on a FDAD schedule, and 70 pupils who attended on a full day, every day schedule (FDED). He measured them at the end of the kindergarten year as well as at the end of grades 1 and 2. There were no statistically significant differences in academic skills among the pupils depending upon their kindergarten attendance pattern as measured by the Circus (1977) "Number Recognition" and "How Much and How Many" subtests (kindergarten), or by the Metropolitan Achievement Test (1970) "Mathematics Computation" subtest (grades 1 or 2).

Half day, every day / Full day, every day programs.

The literature search also reveals conflicting results when comparing kindergarten programs that meet for a half day, every day (HDED) to those that meet for a full day, every day (FDED). Significant differences favoring FDED kindergarten were reported by Guidubaldi, Kehle, and Cleminshaw (1975), Henshaw (1973), and Nieman and Gastright (1975). Children who attended kindergarten on a FDED schedule scored significantly higher on all but one subtest of the California Achievement Test (CAT) when compared to those children who attended kindergarten on a HDED schedule (Humphrey, 1980). Nieman and Gastright (1981) studied 410 students in FDED kindergarten and 141 students in HDED kindergarten. They found that the FDED students scored significantly higher on the Metropolitan Readiness Test (MRT), compared to the HDED students. Stinard (1982) concludes that FDED kindergarten pupils demonstrate significantly higher achievement than do HDED pupils. By contrast, significant differences between pupils who had attended kindergarten on a FDED schedule and those on a HDED schedule were not found by other researchers. No significant differences between the two meeting patterns on the MRT were reported by Schmidt (1972), Hatcher (1978), and the Texas Governor's Office of Educational Research and Planning (1974). Significant differences in achievement were not found by Johnson (1974) nor by the New York Center (1969).

Longitudinal Research: Half day, every day / Full day, every day

Research studies have been reported in which the long-term effects of differing kindergarten schedules have been examined. These studies have also generated conflicting conclusions. Students who had attended kindergarten on a FDED schedule maintained significantly higher mathematics and reading scores on the Metropolitan Achievement Test (MAT) at the end of fourth and eighth grades compared to students who had attended kindergarten on a HDED schedule (Nieman and Gastright, 1981). Students who

had attended kindergarten on a FDED schedule had significantly higher reading scores when measured at the end of the first grade on the Gates-MacGinitie test when compared to students who attended a HDED kindergarten (Humphrey, 19809). There were statistically significant higher mean scores in vocabulary and comprehension on the Gates-MacGinitie at the end of second grade or third grade for those who had attended kindergarten on a FDED schedule as compared to those on a HDED schedule (Humphrey, 1983). Students with preschool and FDED kindergarten scored significantly higher than students with preschool and HDED kindergarten when both groups were measured at the end of preschool, kindergarten, first, and second grades on five different standardized tests over four years of research (Nieman and Gastright, 1975). In all 14 areas of the Comprehension Tests of Basic Skills administered while in the third grade, students who had attended kindergarten on a FDED schedule had higher means than those on a HDED schedule. Ten of the fourteen means were statistically significantly higher for FDED over HDED (Humphrey, 1983). On the other hand, Johnson (1974) did not find significant differences between FDED and HDED students at the end of first and second grades on the Walker Readiness Test nor on the Stanford Early School Achievement Test. No significant differences were found among FDED and HDED pupils on language, math, or reading subcales of the California Achievement Test at the end of first, second, or third grades (Evans and Marken, 1982).

In looking at variables other than academic skills, Humphrey (1983) and Nieman and Gastright (1981) found that fewer FDED students had repeated a grade than HDED. Humphrey (1980) found no differences in absenteeism between FDED and HDED pupils, whereas Evans and Marken (1982) did find a significantly higher incidence of absenteeism for FDED than HDED.

COMMUNITY SCHOOLS KINDERGARTEN SCHEDULING STUDY

Results

Students who entered kindergarten during the 1980-'81, and 1981-'82 school years attended classes on a HDED schedule. Those students who entered kindergarten during the 1982-'83, and 1983-'84 school years attended classes on a FDED schedule. The students were assigned to either Wood Elementary school or Grant Elementary school. Only those students who attended Community Schools during their kindergarten, first, and second grades were included in the study. Students who transferred into the district, or who moved out of the district were not included in the study. Students also were not included in the study if complete data was not available for them. Table 1 gives a breakdown by sex and building of the subjects who participated in the study.

Insert Table 1 about here.

There were 134 students in the study from the 1980-'81 kindergarten year, 123 from the 1981-'82 kindergarten year, 111 from the 1982-'83 year, and 111 from the 1983-'84 year. Of the students who attended kindergarten on a HDED schedule, 55% were males. The students on the FDED schedule were 53% females. Fifty seven percent of the students involved in the HDED program attended Grant Elementary school; of the students in the FDED program, 57% attended Wood Elementary school.

Table 2 gives the arithmetic means (averages) of the measures for all four years. The averages are equal to the sum of the scores of the subjects divided by the number of scores involved in the sum.

Insert Table 2 about here.

There is no consistent pattern to the changes in the means over time. Going across a horizontal row, the means may increase, decrease, or do both.

Table 3 gives the medians of the measures for all four years. The median is the score which divides all of the scores exactly into equally-sized halves. One-half of all the scores lies above the median and one-half lies below the median.

Insert Table 3 about here.

As with the means, there is no consistent pattern to the changes in the medians over time. Over the years the medians increase, decrease, do both, or remain the same.

Table 4 gives the standard deviations of the measures for all four years. The standard deviation of a set of scores is a measure of the degree to which those scores differ from each other. Scores which are more different from each other will have a larger standard deviation than scores which are less different from each other. The size of the standard deviation will also be affected by the range of scores. Scores which range from 1 to 9 will have a smaller standard deviation than scores which range from 1 to 90.

Insert Table 4 about here.

As with the means and medians, there is no consistent change in the standard deviations for a measure over time. The standard deviations increase, decrease, do both, or remain the same.

Inspection of the means in Table 2 indicates that the means over time for a particular measure are not the same. Even within the two kindergarten programs (HDED and FDED) the means from one year to the next differ. The two means for each measure within a program were compared to determine if they differed from each other by a statistically significant amount. The probability level selected for these statistical comparisons was the .05 level. The two means for a measure within a program were determined to be statistically significant if the size of the difference between them would occur by chance five or fewer times per one hundred comparisons. That is, in the long run over many samples of students, would a difference of that size be expected to occur five percent or less of the time purely by chance without any intervention? Table 5 includes only those means within the two programs which are statistically significantly different at the .05 level.

Insert Table 5 about here.

Within the HDED program the students who began kindergarten in 1980 did not differ from the students who began kindergarten

in 1981 in terms of the father's occupation code, the parents' level of education, nor the number of hours of pre-school. The means of those same measures were not statistically significantly different for the 1982 kindergarten students as compared to the 1983 kindergarten students within the FDED program.

The Waupun measures upon entry into kindergarten did show differences between the two years within a program. On five of the seven measures (Audio, Visual, Verbal, Counting, and Word Recognition) the students who were in the 1981-82 kindergarten year had significantly higher means than those in the 1980-81 kindergarten year. A sixth difference (Shapes) was significantly different but higher for the 1980-'81 kindergarten students. On the same seven measures, only two (Motor, and Audio) were significantly higher for the 1983-'84 kindergarten students as compared to the 1982-'83 students within the FDED program. One measure (Shapes, the same one as for the HDED program) was significantly higher for the first of the two years within the FDED program.

At the end of the kindergarten year significant differences existed between the students within the programs. For the students in the HDED program, the students in kindergarten during the 1981-'82 school year had significantly higher means on four of the eight measures (Visual, Language, Quantitative, and Days out of class) when compared to the students in kindergarten during the 1980-'81 school year. For the HDED program the remaining means were not statistically different. Within the FDED program the 1983-'84 kindergarten students had significantly higher means on four of the eight measures (Auditory, Visual, Composite, and Waupun Post) when compared to the 1982-'83 kindergarten students. The other four means within the FDED program were not statistically significantly different between the two years.

During the spring of the first grade only one statistically significant difference existed between the years within the programs. The only difference that was significant was within the HDED program on the Comprehension subtest of the Gates-MacGinitie Test.

In the fall of the second grade only two differences in means (Listening and Mathematics Skills Total) were statistically significant. Both of these were found in the FDED program and both favored the students who were in kindergarten during the 1983-'84 school year.

Both of the kindergarten programs (HDED and FDED) covered two years. Table 5 summarizes the statistically significant differences between the two means for each measure within the two programs.

Table 4 listed the standard deviations for all of the measures. These, like the means, can be compared to determine if they are statistically significantly different. Table 6 lists only those standard deviations which are statistically significantly different at the .05 level between years within the programs.

Insert Table 6 about here.

Only about one-third of the comparisons within programs were statistically significantly different and two-thirds of those were in the FDED program.

The data were then analyzed using an analysis of variance, groups within treatments design. The groups were the kindergarten years and the treatments were the kindergarten scheduling programs (HDED or FDED). This design initially looks at the amount of variability of the measures between years within each program and compares it to the sum of the variability within all four of the years. If this comparison (ratio) is not unlikely to occur by chance, then the years can be considered as separate random samples from the same population. As such, the years within a program can be pooled and comparisons can be made between programs to see if the length of time in kindergarten results in differences in achievement. If this comparison is unlikely to occur by chance, then the years within a program differ significantly from each other. Consequently, the unit of analysis is not the program, but the kindergarten year.

Table 7 presents the ANOVA summary tables for the first four measures made upon entry into kindergarten

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Insert Table 7 about here.

Since all of the ratios were not significant at the .05 level, the four kindergarten years can be considered as coming from a common population. There were no statistically significant differences between the four years on the four measures upon entry into kindergarten.

The students' scores on the Waupun measures upon entry into kindergarten were then compared using the same ANOVA design. Results of these analyses can be found in Table 8.

Insert Table 8 about here.

Based upon the ratios for the Waupun measures, the evidence suggests some factors cause the years within the kindergarten programs to differ systematically. The first year within each program has a mean which is less than the second year within each program except for Shapes in which the first year is greater than the second year. There is considerable variability between the

years within each program. Statistical tests of the differences in means between the years within the two programs for the 7 Waupun measures reveal that 9 of the 14 comparisons are statistically significant at the .05 level (see Table 5). The students in the various kindergarten years draw from different subpopulations that differ (at the start of kindergarten) in average ability. Subsequent analyses should compare years and not programs.

The subjects involved in this study were intact classes. The subjects were not matched across programs nor were they randomly assigned to the programs. These two methods of establishing experimental control could not be used in this study. The subjects did exhibit statistical differences in means and variability on the Waupun measures between the years within the programs. The differences in average ability among the students at the start of the study that were not accounted for in designing the study would effect the results of the study. Therefore, a method of adjusting the data had to be used to take into account the fact that the subjects did differ from each other on the Waupun measures. The method selected, Analysis of Covariance, adjusts the scores of the subjects to remove the differences that existed at the start of the experiment.

The effects of the following variables (called covariates) were removed from subsequent measures: sex, occupation code, father's education, mother's education, number of hours of pre-school, the seven Waupun measures upon entry into kindergarten, and the Waupun post measure at the end of kindergarten. The effects of those covariates were statistically accounted for in all of the measures taken at the end of kindergarten (except Percent Retained), in the spring of the first grade, and in the fall of the second grade. (According to Table 2, no students were retained for the 1982-'83 school year. The interpretation of statistically adjusting zero is nonsensical.) Table 9 presents the arithmetic means of the variables after they have been adjusted for the covariates.

Insert Table 9 about here.

The analysis of covariance procedure first calculates the average score of the covariate for all of the subjects. From that overall average is subtracted the average score on the covariate of the particular kindergarten year. That difference is multiplied by a constant and the product is added to the average score of the dependent measure of the particular kindergarten year to give the adjusted average on that measure for that year. If the mean of the covariate for a year is less than the overall mean of the covariate of all four years, then the adjusted mean of the dependent measure for that year will be greater than the unadjusted mean. (For example, the overall

covariate mean for the Waupun Audio measure is 4.26. The 1980-'81 kindergarten year has a mean of 3.81 which is less than 4.26. Therefore, the adjusted mean of the Auditory subtest of the Metropolitan Readiness Test (6.88) will be greater than the unadjusted mean (6.21).) If the mean of the covariate for a year is greater than the overall mean of the covariate of all four years, then the adjusted mean of the dependent measure for that year will be less than the unadjusted mean. (For example, compare the changes in values for 1983-'84 kindergarten year, using Waupun Audio as the covariate and Auditory subtest as the dependent measure.)

Table 10 contains only those means which are statistically significantly different at the .05 level between pairs of means within each of the kindergarten scheduling programs after the means had been adjusted for the covariates.

Insert Table 10 about here.

Of the adjusted means at the end of kindergarten only one exhibits a statistically significant difference. The difference between the 1980-'81 and 1981-'82 means for the Auditory subtest of the MRT is statistically significant at the .05 level. All other differences between years within a program are not statistically significant at the .05 level.

Of the measures taken during the spring of the first grade, four of the six differences in means between years within the programs were statistically significant at the .05 level. Of the measures taken in the fall of the second grade, 10 of the 16 differences in means between years within the programs were statistically significant at the .05 level. On these two sets of later measurements, the differences in achievement between HDED and FDED is more a reflection of differences between groups within programs than it is differences between programs.

Table 11 lists the tests of significance between the means of the two kindergarten programs (HDED and FDED) for the outcome measures. Of the 17 measures, only one (6%) was statistically significantly different at the .05 level. This is the number expected to be significant even if there are no treatment effects.

Insert Table 11 about here.

COMMUNITY SCHOOLS KINDERGARTEN SCHEDULING STUDY

Discussion

The purpose of this study was to determine if the FDED scheduling of kindergarten students results in lasting increases in performance as compared to students in the HDED program. It can be argued that doubling the amount of time a student spends in kindergarten should better prepare him/her for the next years of schooling. On the other hand, it can also be argued that the existence of so many unknowns makes it unlikely that differences in performance will continue over time. It was hoped that the present study would clarify the relationship between the length of time in kindergarten and academic performance.

On entering kindergarten four measures were obtained: the occupation coding of the student's father; the level of education of the mother and of the father; and the number of hours of pre-school the student had. On these four measures the students in the four years involved in the study did not exhibit statistically significant differences (see Table 7). There were no differences among the students upon entering kindergarten as assessed by those four measures. The students could have differed in significant ways on other measures, but they did not differ on these measures.

During the first quarter of the kindergarten year the students were screened by use of the Waupun strategies. The analysis of variance of these measures indicates that years within the programs exhibit statistically significant differences. There is more variability within a particular scheduling program than between the two programs. Kindergarten years 1980-'81 and 1981-'82 (or 1982-'83 and 1983-'84) are more dissimilar than are HDED and FDED. Because of these uncontrolled differences in the beginning of the study, the means of the students had to be adjusted via analysis of covariance.

At the end of kindergarten there were almost no statistically significant differences between years within a program or between the two scheduling programs after the differences in initial levels were taken into account. Although more learning opportunities were provided by the FDED program, these were not documented by the MRT.

On the measures taken in the spring of the first grade and in the fall of the second grade, the students' scores become more different from each other both between the years within a program and between the two programs even after initial differences were taken into account. The number of differences in means which are statistically significant dramatically increases. As students who attended kindergarten for a half day attend school for a full day in the first and second grades, their achievement scores become more different when comparing one year to the next. The same can be said for those students who attended kindergarten for a full day.

COMMUNITY SCHOOLS KINDERGARTEN SCHEDULING STUDY

Bibliography

Biemiller, A. A longitudinal study of thriving, average or non-thriving kindergarten children. Toronto, Ontario: Ontario Department of Education and Ontario Ministry of Colleges and Universities, 1983. (ERIC Document Reproduction Service No. ED 229 114)

Chippewa Falls Public Schools. Comparative study of some features of the all-day and half-day kindergarten sessions. Chippewa Falls, Wisconsin, May 1963.

Cleminshaw, H. K., & Guidubaldi, J. The effect of time and structure on kindergarten student social and academic performance. The Journal of Educational Research, 1979, 73, 92-101.

Evans, E. D., & Marken, D. "Longitudinal follow-up comparison of conventional and extended-day public school kindergarten programs." Paper presented at the meeting of the American Educational Research Association, San Francisco, CA, 1982.

Gornowich, D. J., Volker, R. C., & Landry, R. A school district looks at an alternative to half-day, everyday kindergarten programs. Grand Rapids, MI: Grand Rapids Independent School District, 1974. (ERIC Document Reproduction Service No. ED 107 347)

Governor's Office of Educational Research and Planning. An inquiry into half-day/full-day kindergarten programs in Texas. Monograph #1, Austin, Texas, November, 1974.

Guidubaldi, J., Kehle, T., & Cleminshaw, H. Effects of extended day kindergarten on children's cognitive functioning. Unpublished study, Kent State University, 1975.

Gullo, D. F., & Clements, D. H. The effects of kindergarten schedule on achievement, classroom behavior and attendance. The Journal of Educational Research, 1984, 78, 51-56.

Hatcher, B. A. A study of the cognitive, affective and psychomotor development of children attending half-day and full-day state supported kindergartens. Unpublished doctoral dissertation, School of Education, North Texas State University, Denton, Texas, 1978.

Hatcher, B. A., Schmidt, V. E., & Cook, J. R. Full-day vs half-day kindergartens: no difference. Phi Delta Kappan, 1979, 61, 68.

Henshaw, K. "An experimental all-day kindergarten program." In 40 Innovative Programs in Early Childhood Education, edited by B. J. Fallon. Belmont, CA: Fearson Publishers, 1973.

Humphrey, J. W. A Study of the Effectiveness of Full-day Kindergarten. Evansville, Ind.: Evansville-Vanderburgh School Corporation, 1980.

Humphrey, J. W. A Longitudinal Study of the Effectiveness of Full-day Kindergarten. Evansville, Ind.: Evansville-Vanderburgh School Corporation, 1983.

Johnson, E. W. An experimental study of the comparison of pupil achievement in the all-day kindergarten and one-half day control group, 1974. (ERIC Document Reproduction Service No. Ed 115 361)

Mouw, A. J. The description and evaluation of the alternate day-full day kindergarten programs. Madison, WI: Wisconsin Public Schools, 1976. (ERIC Document Reproduction Service No. ED 129 435)

New York Center for Field Research and School Services. An evaluation of the extended kindergarten program. New York University, New York, 1969.

Nieman, R. H., & Gastright, J. F. "Preschool plus all-day kindergarten: the cumulative effects of early childhood programs in cognitive growth of four and five-year old children." Paper presented at the meeting of the American Educational Research Association, Washington, D. C., 1975.

Nieman, R. H., & Gastright, J.F. The long-term effects of title I preschool and all-day kindergarten. Phi Delta Kappan, 1981, 63, 184-185.

Schmidt, V. An investigation of the relationship between length of school day and pupil achievement in the state-supported kindergartens of Texas. A pilot study, North Texas State University, Denton, Texas, 1972.

Smith, C. L. A comparison of children in the all-day, alternate day kindergarten with children in the half-day, every day kindergarten in self-concept, academic and social development at the kindergarten and fourth-grade levels (Doctoral dissertation, University of North Dakota, 1980). Dissertation Abstracts International, 41, 931a. (University Microfilms No. 8020371)

Stinard, T. A. Synopsis of research on kindergarten scheduling: half-day, everyday; full-day, alternate day: and full-day, everyday. Unpublished manuscript, Grant Wood Area Education Agency, Cedar Rapids, IA, 1982.

Ulrey, G. L., Alexander, K., Bender, B., & Gillis, H. Effects of length of school day on kindergarten school performance and parent satisfaction. Psychology in the Schools, 1982, 19, 238-242.

COMMUNITY SCHOOLS KINDERGARTEN SCHEDULING STUDY

Table 1. Breakdown by sex and building of subjects within the kindergarten programs each year.

Kindergarten Year	Kindergarten Program	Number of Subjects Grouped By Sex	By Building
1980-'81	Half day	Males 67	Wood 63
		Females 67	Grant 71
1981-'82	Half day	Males 74	Wood 48
		Females 49	Grant 75
1982-'83	Full day	Males 57	Wood 63
		Females 54	Grant 48
1983-'84	Full day	Males 47	Wood 64
		Females 64	Grant 47
Total 1980-'82	Half day	Males 141	Wood 111
		Females 116	Grant 146
Total 1982-'84	Full day	Males 104	Wood 127
		Females 118	Grant 95

COMMUNITY SCHOOLS KINDERGARTEN SCHEDULING STUDY

Table 2. Arithmetic means of the variables for all four years.

KINDERGARTEN PROGRAM	Half Day		Full Day	
KINDERGARTEN YEAR	'80-81	'81-82	'82-83	'83-84
NUMBER OF OBSERVATIONS	134	123	111	111
ENTRY INTO KINDERGARTEN				
Occupation	36.99	38.22	39.63	39.99
Dad's Education	13.79	13.85	14.00	14.14
Mom's Education	13.59	13.89	13.79	14.04
Preschool Hours	203.85	174.19	174.19	179.85
Motor (Waupun)	4.96	5.21	4.91	5.44
Audio (Waupun)	3.81	4.47	4.08	4.75
Visual (Waupun)	3.71	4.48	3.91	3.98
Verbal (Waupun)	4.36	4.71	4.20	4.33
Shapes (Waupun)	1.45	1.28	1.25	1.13
Counting	21.47	38.37	36.67	37.84
Word Recognition	14.02	25.86	19.25	20.68
END OF KINDERGARTEN				
Metropolitan Readiness Tests				
Auditory - Stanine	6.21	6.09	7.07	7.49
Visual - Stanine	5.64	6.11	6.83	7.27
Language - Stanine	5.91	6.41	6.46	6.86
Quantitative - Stanine	5.76	6.41	6.65	6.98
Composite [(A+V+L)/3]				
Stanine	5.93	6.17	6.94	7.42
Percentile Rank	63.62	67.48	78.81	84.72
Waupun Post	4.00	4.10	4.81	5.59
Percent Retained	5.97	1.63	0.00	0.90
Days out of Class	7.38	9.33	10.40	9.31
SPRING OF FIRST GRADE				
Gates-MacGinitie - Grade Equivalents				
Vocabulary	2.33	2.39	2.42	2.29
Comprehension	2.37	2.59	2.55	2.53
Total	2.32	2.47	2.46	2.40
FALL OF SECOND GRADE				
Iowa Tests of Basic Skills - Grade Equivalents - Iowa Norms				
Word Association	2.04	1.81	2.09	2.30
Listening	2.30	2.49	2.27	2.73
Vocabulary	2.09	2.20	2.23	2.23
Reading Comprehension	2.34	2.57	2.48	2.50
Language Skills Total	2.70	2.86	2.66	2.51
Work-Study Skills Tot	2.26	2.38	2.33	2.44
Mathematics Skills To	2.28	2.26	2.08	2.34
Composite	2.38	2.36	2.30	2.41

COMMUNITY SCHOOLS KINDERGARTEN SCHEDULING STUDY

Table 3. Arithmetic medians of the variables for all four years.

KINDERGARTEN PROGRAM	Half Day		Full Day	
KINDERGARTEN YEAR	'80-81	'81-82	'82-83	'83-84
NUMBER OF OBSERVATIONS	134	123	111	111
ENTRY INTO KINDERGARTEN				
Occupation	37	40	41	41
Dad's Education	13	13	13	13
Mom's Education	13	13	13	13
Preschool Hours	0	0	0	90
Motor (Waupun)	5	5	5	6
Audio (Waupun)	4	4	4	5
Visual (Waupun)	4	5	4	4
Verbal (Waupun)	5	5	4	5
Shapes (Waupun)	1	1	1	1
Counting	20	29	29	29
Word Recognition	11	11	10	11
END OF KINDERGARTEN				
Metropolitan Readiness Tests				
Auditory - Stanine	6	6	7	7
Visual - Stanine	5	6	7	8
Language - Stanine	6	6	6	7
Quantitative - Stanine	6	6	7	7
Composite [(A+V+L)/3]				
Stanine	6	6	7	8
Percentile Rank	63	71	83	91
Waupun Post	4	4	5	6
Percent Retained	0	0	0	0
Days out of Class	6	8	8	9
SPRING OF FIRST GRADE				
Gates-MacGinitie - Grade Equivalents				
Vocabulary	2.35	2.40	2.40	2.20
Comprehension	2.30	2.40	2.40	2.40
Total	2.30	2.30	2.40	2.30
FALL OF SECOND GRADE				
Iowa Tests of Basic Skills - Grade Equivalents - Iowa Norms				
Word Association	1.90	1.60	1.90	2.20
Listening	2.20	2.40	2.30	2.50
Vocabulary	2.30	2.10	2.30	2.20
Reading Comprehension	2.20	2.50	2.40	2.20
Language Skills Total	2.60	2.90	2.70	2.30
Work-Study Skills Tot	2.20	2.30	2.20	2.20
Mathematics Skills To	2.30	2.30	2.00	2.30
Composite	2.30	2.20	2.20	2.30

COMMUNITY SCHOOLS KINDERGARTEN SCHEDULING STUDY

Table 4. Standard deviations of the variables for all four years.

KINDERGARTEN PROGRAM	Half Day		Full Day	
KINDERGARTEN YEAR	'80-81	'81-82	'82-83	'83-84
NUMBER OF OBSERVATIONS	134	123	111	111
ENTRY INTO KINDERGARTEN				
Occupation	11.80	12.92	14.00	12.35
Dad's Education	2.12	2.04	2.11	2.08
Mom's Education	1.70	1.64	1.76	1.80
Preschool Hours	284.92	256.95	278.14	255.82
Motor (Waupun)	1.15	1.24	1.30	1.02
Audio (Waupun)	1.03	0.85	0.91	0.88
Visual (Waupun)	0.99	1.13	1.14	1.33
Verbal (Waupun)	0.90	1.05	0.97	1.20
Shapes (Waupun)	0.50	0.45	0.43	0.33
Counting	11.96	28.84	26.59	27.19
Word Recognition	16.04	32.92	27.94	26.68
END OF KINDERGARTEN				
Metropolitan Readiness Tests				
Auditory - Stanine	1.81	1.88	1.50	1.29
Visual - Stanine	1.54	1.57	1.65	1.60
Language - Stanine	1.84	1.96	1.73	1.68
Quantitative - Stanine	1.50	1.66	1.46	1.46
Composite [(A+V+L)/3]				
Stanine	1.45	1.61	1.45	1.30
Percentile Rank	22.13	23.45	18.68	15.09
Waupun Post	0.42	0.59	0.81	0.59
Percent Retained	23.78	12.70	0.00	9.49
Days out of Class	5.78	6.85	7.73	5.65
SPRING OF FIRST GRADE				
Gates-MacGinitie - Grade Equivalents				
Vocabulary	0.76	0.78	0.76	0.72
Comprehension	0.79	0.87	0.80	0.84
Total	0.79	0.82	0.78	0.80
FALL OF SECOND GRADE				
Iowa Tests of Basic Skills - Grade Equivalents - Iowa Norms				
Word Association	1.00	0.94	1.01	1.23
Listening	0.98	1.07	1.08	1.35
Vocabulary	0.93	1.00	0.96	1.47
Reading Comprehension	1.02	1.04	1.00	1.50
Language Skills Total	0.96	0.98	0.91	1.37
Work-Study Skills Tot	0.80	0.88	0.88	1.41
Mathematics Skills To	0.63	0.65	0.56	1.06
Composite	0.71	0.74	0.72	1.23

COMMUNITY SCHOOLS KINDERGARTEN SCHEDULING STUDY

Table 5. Statistically significant differences ($p < .05$) between means within programs.

KINDERGARTEN PROGRAM	Half Day		Full Day	
KINDERGARTEN YEAR	'80-81	'81-82	'82-83	'83-84
NUMBER OF OBSERVATIONS	134	123	111	111
ENTRY INTO KINDERGARTEN				
Occupation				
Dad's Education				
Mom's Education				
Preschool Hours				
Motor (Waupun)			4.91	5.44
Audio (Waupun)	3.81	4.47	4.08	4.75
Visual (Waupun)	3.71	4.48		
Verbal (Waupun)	4.36	4.71		
Shapes (Waupun)	1.45	1.28	1.25	1.13
Counting	21.47	38.37		
Word Recognition	14.02	25.86		
END OF KINDERGARTEN				
Metropolitan Readiness Tests				
Auditory - Stanine			7.07	7.49
Visual - Stanine	5.64	6.11	6.83	7.27
Language - Stanine	5.91	6.41		
Quantitative - Stanine	5.76	6.41		
Composite [(A+V+L)/3]				
Stanine			6.94	7.42
Percentile Rank			78.81	84.72
Waupun Post			4.81	5.59
Percent Retained				
Days out of Class	7.38	9.33		
SPRING OF FIRST GRADE				
Gates-MacGinitie - Grade Equivalents				
Vocabulary				
Comprehension	2.37	2.59		
Total				
FALL OF SECOND GRADE				
Iowa Tests of Basic Skills - Grade Equivalents - Iowa Norms				
Word Association				
Listening			2.27	2.73
Vocabulary				
Reading Comprehension				
Language Skills Total				
Work-Study Skills Tot				
Mathematics Skills To			2.08	2.34
Composite				

COMMUNITY SCHOOLS KINDERGARTEN SCHEDULING STUDY

Table 6. Statistically significant differences ($p < .05$) between the standard deviations within programs.

KINDERGARTEN PROGRAM	Half Day		Full Day	
KINDERGARTEN YEAR	'80-81	'81-82	'82-83	'83-84
NUMBER OF OBSERVATIONS	134	123	111	111
ENTRY INTO KINDERGARTEN				
Occupation				
Dad's Education				
Mom's Education				
Preschool Hours				
Motor (Waupun)			1.30	1.02
Audio (Waupun)	1.03	0.85		
Visual (Waupun)				
Verbal (Waupun)			0.97	1.20
Shapes (Waupun)			0.43	0.33
Counting	11.96	28.84		
Word Recognition	16.04	32.92		
END OF KINDERGARTEN				
Metropolitan Readiness Tests				
Auditory - Stanine				
Visual - Stanine				
Language - Stanine				
Quantitative - Stanine				
Composite [(A+V+L)/3]				
Stanine				
Percentile Rank			18.68	15.09
Waupun Post	0.42	0.59	0.81	0.59
Percent Retained	23.78	12.70		
Days out of Class			7.73	5.65
SPRING OF FIRST GRADE				
Gates-MacGinitie - Grade Equivalents				
Vocabulary				
Comprehension				
Total				
FALL OF SECOND GRADE				
Iowa Tests of Basic Skills - Grade Equivalents - Iowa Norms				
Word Association			1.01	1.23
Listening			1.08	1.35
Vocabulary			0.96	1.47
Reading Comprehension			1.00	1.50
Language Skills Total			0.91	1.37
Work-Study Skills Tot			0.88	1.41
Mathematics Skills To			0.56	1.06
Composite			0.72	1.23

Table 7. ANOVA Summary Tables for Pre-Kindergarten Measures

Occupation

Source	df	SS	ms	MSR	Sig
Between GwA	2	104.22	52.11	0.32	No
Within Groups	475	77884.04	163.97		
Treatments (A)	1	4.84	4.84	11.52	No
Between GwA	2	0.84	0.42		
Total	3	5.68			

Father's Education

Source	df	SS	ms	MSR	Sig
Between GwA	2	1.32	0.66	0.15	No
Within Groups	475	2087.92	4.40		
Treatments (A)	1	0.06	0.060	12.00	No
Between GwA	2	0.01	0.005		
Total	3	0.07			

Mother's Education

Source	df	SS	ms	MSR	Sig
Between GwA	2	9.25	4.63	1.54	No
Within Groups	475	1425.68	3.00		
Treatments (A)	1	0.03	0.030	0.86	No
Between GwA	2	0.07	0.035		
Total	3	0.10			

Pre-School Hours

Source	df	SS	ms	MSR	Sig
Between GwA	2	58196	29098.00	0.40	No
Within Groups	475	34850316	73369.09		
Treatments (A)	1	144.00	144.00	0.63	No
Between GwA	2	455.88	227.94		
Total	3	599.88			

Table 8. ANOVA Summary Tables for Waupun Measures Upon Entry into Kindergarten

Waupun Motor

Source	df	SS	ms	MSR	Sig
Between GwA	2	19.30	9.65	6.84	Yes
Within Groups	475	669.49	1.41		
Treatments (A)	1	0.0082	0.0082	0.95	No
Between GwA	2	0.1720	0.086		
Total	3	0.1802			

Waupun Audio

Source	df	SS	ms	MSR	Sig
Between GwA	2	52.86	26.43	30.73	Yes
Within Groups	475	408.93	0.86		
Treatments (A)	1	0.0784	0.0784	0.357	No
Between GwA	2	0.4395	0.2198		
Total	3	0.5179			

Waupun Visual

Source	df	SS	ms	MSR	Sig
Between GwA	2	38.30	19.15	14.51	Yes
Within Groups	475	629.00	1.32		
Treatments (A)	1	0.0226	0.0226	0.15	No
Between GwA	2	0.2992	0.1496		
Total	3	0.3218			

Waupun Verbal

Source	df	SS	ms	MSR	Sig
Between GwA	2	8.801	4.40	4.11	Yes
Within Groups	475	508.131	1.07		
Treatments (A)	1	0.073	0.073	2.09	No
Between GwA	2	0.070	0.035		
Total	3	0.143			

Table 8 Continued.

Waupun Shapes

Source	df	SS	ms	MSR	Sig
Between GwA	2	2.65	1.33	7.00	Yes
Within Groups	475	91.10	0.19		
Treatments (A)	1	0.0324	0.0324	3.24	No
Between GwA	2	0.0199	0.0100		
Total	3	0.0523			

Waupun Counting

Source	df	SS	ms	MSR	Sig
Between GwA	2	18391.51	9195.76	15.49	Yes
Within Groups	475	282016.00	593.72		
Treatments (A)	1	53.8756	53.8756	0.751	No
Between GwA	2	143.4778	71.7389		
Total	3	197.3534			

Waupun Word Recognition

Source	df	SS	ms	MSR	Sig
Between GwA	2	9103.93	4551.96	6.49	Yes
Within Groups	475	333394.00	701.88		
Treatments (A)	1	0.001	0.001	0.00003	No
Between GwA	2	71.115	35.558		
Total	3	71.116			

COMMUNITY SCHOOLS KINDERGARTEN SCHEDULING STUDY

Table 9. Arithmetic means of the variables adjusted for the covariates for all four years.

KINDERGARTEN PROGRAM	Half Day		Full Day	
KINDERGARTEN YEAR	'80-81	'81-82	'82-83	'83-84
NUMBER OF OBSERVATIONS				
ENTRY INTO KINDERGARTEN				
Occupation				
Dad's Education				
Mom's Education				
Preschool Hours				
Motor (Waupun)				
Audio (Waupun)				
Visual (Waupun)				
Verbal (Waupun)				
Shapes (Waupun)				
Counting				
Word Recognition				
END OF KINDERGARTEN				
Metropolitan Readiness Tests				
Auditory - Stanine	6.88	6.36	7.02	6.63
Visual - Stanine	6.17	6.20	6.71	6.69
Language - Stanine	6.61	6.59	6.42	5.98
Quantitative - Stanine	6.48	6.64	6.51	6.14
Composite [(A+V+L)/3]				
Stanine	6.65	6.40	6.82	6.54
Percentile Rank	72.67	70.36	77.90	73.60
Waupun Post				
Percent Retained				
Days out of Class	7.27	8.37	10.48	10.15
SPRING OF FIRST GRADE				
Gates-MacGinitie - Grade Equivalents				
Vocabulary	2.66	2.45	2.41	1.91
Comprehension	2.72	2.67	2.53	2.12
Total	2.67	2.53	2.43	2.00
FALL OF SECOND GRADE				
Iowa Tests of Basic Skills - Grade Equivalents - Iowa Norms				
Word Association	2.32	1.74	2.13	2.10
Listening	2.65	2.54	2.18	2.29
Vocabulary	2.57	2.28	2.21	1.69
Reading Comprehension	2.77	2.62	2.46	2.03
Language Skills Total	3.14	2.98	2.63	1.97
Work-Study Skills Tot	2.68	2.41	2.32	2.03
Mathematics Skills To	2.59	2.25	2.06	2.08
Composite	2.78	2.40	2.28	2.00

COMMUNITY SCHOOLS KINDERGARTEN SCHEDULING STUDY

Table 10. Statistically significant differences ($p < .05$) between the arithmetic means of the variables after adjusting for the covariates.

KINDERGARTEN PROGRAM	Half Day		Full Day	
KINDERGARTEN YEAR	'80-81	'81-82	'82-83	'83-84
NUMBER OF OBSERVATIONS				
ENTRY INTO KINDERGARTEN				
Occupation				
Dad's Education				
Mom's Education				
Preschool Hours				
Motor (Waupun)				
Audio (Waupun)				
Visual (Waupun)				
Verbal (Waupun)				
Shapes (Waupun)				
Counting				
Word Recognition				
END OF KINDERGARTEN				
Metropolitan Readiness Tests				
Auditory - Stanine	6.88	6.36		
Visual - Stanine	6.17	6.20	6.71	6.69
Language - Stanine				
Quantitative - Stanine				
Composite [(A+V+L)/3]				
Stanine				
Percentile Rank				
Waupun Post				
Percent Retained				
Days out of Class				
SPRING OF FIRST GRADE				
Gates-MacGinitie - Grade Equivalents				
Vocabulary	2.66	2.45	2.41	1.91
Comprehension			2.53	2.12
Total			2.43	2.00
FALL OF SECOND GRADE				
Iowa Tests of Basic Skills - Grade Equivalents - Iowa Norms				
Word Association	2.32	1.74		
Listening				
Vocabulary	2.57	2.28	2.21	1.69
Reading Comprehension			2.46	2.03
Language Skills Total			2.63	1.97
Work-Study Skills Tot	2.68	2.41	2.32	2.03
Mathematics Skills To	2.59	2.25		
Composite	2.78	2.40	2.28	2.00

COMMUNITY SCHOOLS KINDERGARTEN SCHEDULING STUDY

Table 11. Tests of significance for the outcome measures between the kindergarten programs.

Outcome Measure	Test of Significance
END OF KINDERGARTEN	
Metropolitan Readiness Tests	
Auditory	NS
Visual	$p < .05$
Language	NS
Quantitative	NS
Composite [(A+V+L)/3]	NS
Days out of Class	NS
SPRING OF FIRST GRADE	
Gates-MacGinitie	
Vocabulary	NS
Comprehension	NS
Total	NS
FALL OF SECOND GRADE	
Iowa Tests of Basic Skills	
Word Association	NS
Listening	NS
Vocabulary	NS
Reading Comprehension	NS
Language Skills Total	NS
Work-Study Skills Total	NS
Mathematics Skills Total	NS
Composite	NS

NS = Not significant